

## Mathematics 1110H – Calculus I: Limits, derivatives, and Integrals

TRENT UNIVERSITY, Winter 2021

### Quiz #9

*Tuesday, 23 March.*

*Available on Blackboard at 12:00 a.m. Tuesday morning.*

*Due on Blackboard by 11:59 p.m. Tuesday night.*

*Solutions will be posted on Thursday, 25 March.*

**Submission:** Scanned or photographed solutions are fine, so long as they are legible. Please try to make sure that they are oriented correctly – if they are sideways or upside down, they're rather harder to mark! Submission as a single pdf is strongly preferred, but multiple files and/or other common formats are probably OK in a pinch. Please submit your solutions via Blackboard's Assignments module; if Blackboard does not acknowledge a successful upload, please try again. As a *last* resort, email your solutions to the instructor at: [sbilaniuk@trentu.ca](mailto:sbilaniuk@trentu.ca)

**Reminder:** Per the course outline, *all work submitted for credit must be written up entirely by yourself, giving due credit to all relevant sources of help and information.* For this quiz, you are permitted to use your textbook and all other course material, from this and any other mathematics course(s) you have taken or are taking now, but *you may not use any other sources or aids, nor give or receive any help*, except to ask the instructor to clarify questions and to use a calculator (any that you like).

Show all your work! Simplify where you conveniently can.

1. A hot air balloon rising vertically is tracked by an observer 4 *km* from the point the balloon lifted off. How fast is the balloon rising at the instant that the observer's line of sight makes an angle of  $\frac{\pi}{6}$  *rad* with the horizontal if this angle is increasing at a rate of 0.3 *rad/min* at this instant? [5]s